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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/673,208	10/13/2000	Nobuaki Hashimoto	107281	3514

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EXAMINER

ZARNEKE, DAVID A

ART UNIT	PAPER NUMBER
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2827

DATE MAILED: 12/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/673,208

Applicant(s)

HASHIMOTO, NOBUAKI

Examiner

David A. Zarneke

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-53 is/are pending in the application.
- 4a) Of the above claim(s) 28-53 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 October 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of claims 1-27 generally and the species of Figure 8 (claims 2, 5, 8, 11, 14, 17, 20, 23 and 26) specifically in the paper dated 10/6/03 is acknowledged.

The traversal is on the ground(s) that restriction is improper because 1) this is a PCT-US National Stage Application and US law cannot be applied; 2) the examiner has not meet the standard in PCT-US National Stage Applications because the technical features that define the contribution which each claimed invention as whole, makes over the prior art were not discussed; and 3) the subject matter of claims 1-27 are sufficiently related that a thorough search of one would encompass the search of the remaining therefore posing no serious burden.

Regarding point one, this is not found persuasive because, particularly with respect to the process claims, separate technical features are presented with regard to the steps of depositing the plating layers.

With respect to point two, this is not found persuasive because the process steps define separate technical features in the first place in that they deposit plating layers using different process steps.

As to the third point, this argument is found persuasive, therefore the examine will examine claims 1-27.

The requirement is still deemed proper and is therefore made FINAL.

This application contains claims 28-53 drawn to an invention nonelected with traverse. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1, 4, 7, 10, 13, 16, 19, 22 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami et al., JP 11040620.

Murakami (figures 6-8) teaches a semiconductor device or a mounting substrate comprising:

a substrate (3) in which a plurality of through holes (10) are formed;
an interconnect pattern (4) formed on the substrate and passing over the through holes;

a first plating layer (13) formed on the interconnect pattern surface opposite to the substrate [0034];

a second plating layer (10 or 18) formed on the interconnect pattern surface looking toward the substrate in the through holes;

a semiconductor chip (1) mounted on the substrate and electrically connected to the first plating layer; and

a conductive material (5) provided on the second plating layer,
wherein the first (tin plating [0034]) and second plating (beer plating [0048]) layers have different properties.

Murakami fails to teach the use of a resin on the first plating layer.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use an underfill resin on the first plating layer because underfill resins are conventionally used in the art to protect and strengthen the package. The use of conventional materials to perform their known functions in a conventional process is obvious. In re Raner 134 USPQ 343 (CCPA 1962).

Regarding claim 4 and 16, the first plating layer formed to be thinner than the second plating layer is an obvious matter of design choice. Design choices and changes of size are generally recognized as being within the level of ordinary skill in the art (MPEP 2144.04(d)).

With respect to claims 7 and 19, Murakami teaches the first plating layer to be a tin plating [0034] and second plating layer to be a beer plating [0048].

As to claim 10, the resin being an adhesive that includes conductive particles to constitute an anisotropic conductive material; and wherein the semiconductor chip is mounted by face-down bonding with the anisotropic conductive material interposed is a conventionally known in the art material and chip bonding technique. The use of conventional materials to perform there known functions in a conventional process is obvious. In re Raner 134 USPQ 343 (CCPA 1962).

In re claim 22, mounting the device of claim 1 onto a circuit board is a conventionally known in the art next step. Mounting devices to circuit boards is common and any skilled artisan would be motivated to use the device of claim 1 in this manner. The use of conventional materials to perform there known functions in a conventional process is obvious. In re Raner 134 USPQ 343 (CCPA 1962).

Regarding claim 25, equipping an electronic instrument with the device of claim 1 is a conventionally known in the art next step. Equipping electronic instruments with devices is common and any skilled artisan would be motivated to use the device of claim 1 in this manner. The use of conventional materials to perform there known functions in a conventional process is obvious. In re Raner 134 USPQ 343 (CCPA 1962).

Claims 2, 3, 5, 8, 9, 11, 12, 14, 15, 17, 18, 20, 21, 23, 24, 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuda, EP 810656.

Fukuda teaches a semiconductor device or a mounting substrate comprising:

a substrate (1);

a first interconnect pattern (24) formed on one surface of the substrate;

a second interconnect (25) pattern formed on the other surface of the substrate and electrically connected to the first interconnect pattern;

a first plating layer (2) formed on the first interconnect pattern surface opposite to the substrate;

a second plating layer (3) formed on the second interconnect pattern surface opposite to the substrate;

a semiconductor chip (6) mounted on the substrate and electrically connected to the first plating layer; and

a resin (8) provided on the first plating layer,

wherein the first (soft Au) and second (hard Au) plating layers have different properties.

Fukuda fails to teach a conductive material provided on the second plating layer.

It would have been obvious to one of ordinary skill in the art at the time of the invention to put a conductive material on the second plating because the attaching of conductive materials, for example solder balls, to an external surface of a package is a logical and conventional next step to a skilled artisan. Conductive materials, i.e. solder balls, attached to external package surfaces are an obvious matter of design choice. Design choices and changes of size are generally recognized as being within the level of ordinary skill in the art (MPEP 2144.04(d)).

Regarding claims 5, 6, 17 and 18, while Fukuda fails to teach the first plating layer formed to be thinner than the second plating layer, to a skilled artisan this is an

obvious matter of design choice. Design choices and changes of size are generally recognized as being within the level of ordinary skill in the art (MPEP 2144.04(d)).

With respect to claims 8, 9, 20 and 21, while Fukuda only teaches the use of hard and soft Au, it would have been obvious to one of ordinary skill in the art at the time of the invention to use any other equivalent metal that performs the functions of both hard and soft Au (1,48-2,1), such as Ag and/or Al. The substitution of one known equivalent technique for another may be obvious even if the prior art does not expressly suggest the substitution. Ex parte Novak 16 USPQ 2d 2041 (BPAI 1989); In re Mostovych 144 USPQ 38 (CCPA 1964); In re Leshin 125 USPQ 416 (CCPA 1960); Graver Tank & Manufacturing Co. V. Linde Air Products Co. 85 USPQ 328 (USSC 1950).

As to claims 11 and 12, while Fukuda only teaches using a universal underfill and encapsulant resin (8), it is a mere obvious matter of design choice to use a separate conductive adhesive underfill and a separate encapsulant. Design choices and changes of size are generally recognized as being within the level of ordinary skill in the art (MPEP 2144.04(d)).

In re claims 23 and 24, mounting the device of claim 1 onto a circuit board is a conventionally known in the art next step. Mounting devices to circuit boards is common and any skilled artisan would be motivated to use the device of claim 1 in this manner. The use of conventional materials to perform there known functions in a conventional process is obvious. In re Raner 134 USPQ 343 (CCPA 1962).

Regarding claims 26 and 27, equipping an electronic instrument with the device of claim 1 is a conventionally known in the art next step. Equipping electronic instruments with devices is common and any skilled artisan would be motivated to use the device of claim 1 in this manner. The use of conventional materials to perform there known functions in a conventional process is obvious. In re Raner 134 USPQ 343 (CCPA 1962).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David A. Zarneke whose telephone number is (703)-305-3926. The examiner can normally be reached on M-F 10AM-6PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on (703)-308-1233. The fax phone number for the organization where this application or proceeding is assigned is (703)-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)-308-6789.



David A. Zarneke
Primary Examiner
December 5, 2003